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## (54) Method and device for placing inserts in folded paper jackets

(57) For the opening of folded printed items such as newspapers from a rotary press with the object of introducing an insert, the printed items are fed in a hanging position in over a star-wheel with V-shaped pockets into which they are made to fall. The printed items are arranged folded in an asymmetrical manner, so that the rearwards facing half-part has an upstanding, protruding edge (66). After the printed items have fallen downwards, the outer edge of the foremost half-part is gripped by means of a hook, which from the front wall of the pocket is swung rearwards and downwards during secure drawing-back of said protruding edge, and thereafter this is gripped by a hook part (60) on a swivel arm (40) which thus forcibly opens the printed item for the receipt of the insert. The holding hooks are then released, and the swivel arm is influenced for more-or-less firm closing of the printed item before this is conveyed out of the pocket. With the invention there is achieved a handling of the printed items which can be used with a very high degree of security in connection with high working speeds.

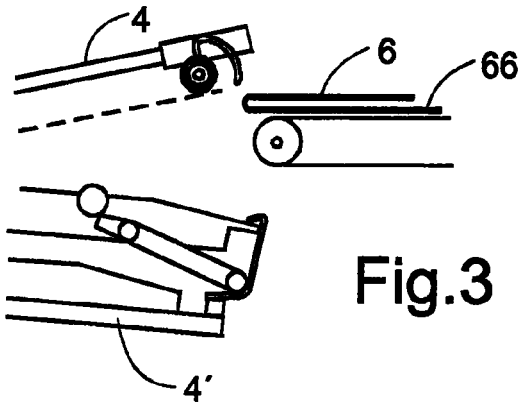


Fig.3

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## Description

**[0001]** The present invention concerns a machine for the placing of so-called inserts in folded printed matter, namely newspapers which are supplied in a tight flow with the fold edge foremost, typically from a rotary press with a capacity of 20-25,000 items per hour, and of the kind which comprises a rotating roller with extending, star-shaped support arms which demarcate V-shaped pockets for successive receipt of the arriving printed matter by the accommodation of these with the fold edge in towards the bottom of the V-pockets, and opening elements which during the rotation of the roller effect a slight opening of the folded printed matter in each of the pockets, and in such a manner that during the movement of the pockets past an insertion station, the thus opened printed items can receive a supplied insert, after which the now supplemented printed items are fed further by the rotation of the roller to or past en extraction station where the finished printed matter is extracted from the pockets for further transport, e.g. to a stacking station.

**[0002]** For the necessary slight opening of the folded printed matter, there is the possibility of making use of vacuum means for sucking the opposing outer sides of the printed matter respectively against the one side or branch of the respective V-pockets, and on the roller at a distance from here a co-rotating suction head at each of the pockets, but this does not generally provide any security that the printed items will open precisely in the middle, or that they will at all open sufficiently to provide free clearance for the introduction of the insert, especially in light of the quite high speed of operation.

**[0003]** In most cases, there arises the special situation that the one side edge of the folded items consists of a folded-together or glued-together spine of the printed matter product, i.e. at this side it is possible to handle the folded item as if it were an assembled sheet item, including at the said suction outwards, but this will not apply at the opposite side, where the sheets of the printed matter are quite loose in relation to one another. Therefore, a practice has been developed whereby a primary opening of the folded printed matter at its spine side is effected, either by said separating suction effect or by sideways introduction of a wedge at the centre area of the spine, after which in the clearance established hereby there is introduced a plate winding of a rotating worm-screw structure, which thereafter can successively reproduce the created opening longitudinally to the outer edge area of the folded printed matter. This is an excellent solution at lower working speeds, but at an aimed-at capacity of up towards 30,000 items per hour, there is considerable risk that the opening of the folded printed matter is not effected in a completely "clean" manner, because the sheets parts in the side opposite the folded spine side and facing towards the opening are not properly fastened on both sides of the opening. Upon introduction of the insert, there can thus occur a crumpling-together of the sheets and herewith a subsequently incomplete insertion, which can very quickly result in a stop in production, which is especially unfortunate with productions of the kind considered here.

**[0004]** A corresponding arrangement is known from DE-A-32 00 594, whereby work is effected with the distinct improvement that newspaper items are folded together around a transverse line lying slightly displaced from the centre cross line of the folded-out newspaper, so that opposite the fold line the folded newspaper will appear with two unequally long, outwardly-extending rectangular edges of the respective half-parts of the folded newspaper. This provides the possibility that use can be made of edge gripping means for secure gripping of the free edge of the one folded half part, while relying on the fact that by means of gravitation the other half part can bring about the necessary opening of the folded item to enable an insert to be introduced into the opening. At high working speeds, however, this gravitational effect will not only be too slow but also be of uncertain influence on the folded item, i.e. this method is not suitable for use at the higher speeds of operation.

**[0005]** However, it has also been realised, cf. US-4,046,367 and US-4,373,710, that it will be possible to bring about a controlled gripping also of the opposite free edge of the asymmetrically-folded product, so that this can be forcibly opened for quick introduction of the insert, but it has herewith been a problem that relevant gripping means in the form of curved hook parts which can be swung inwards require that the outstanding free edge on the asymmetrically-folded printed items has an otherwise undesirably great over-height in order to be able to achieve a gripping effect of maximum reliability.

**[0006]** Here it must be taken into consideration that, in practice, certain crookedness can arise in the folding of the printed items, so that the said over-height of the protruding free edge can be considerably less at the one side than at the other side of the items. This will involve that the over-height, which is already too great, must be even greater, namely in order to ensure a sufficiently great free height for reliable gripping of the free edge at both sides.

**[0007]** The gripping reliability is of decisive importance, and with the present invention it is endeavoured to provide a combination of high gripping security and minimised demands regarding the over-height of the protruding free edge.

**[0008]** Consequently, as starting point for each of the receiving pockets, use is made of a fixed support plate and, at the root hereof, a pivotally mounted wing-plate, and the folded newspapers are received with the low folded half part facing towards the fixed support plate, which outermost/uppermost has a set of curved, retaining hooks which can be swung inwards for forced-control gripping of the free edge of the low folded half

part, quite as known from e.g. US-A-4,373,710. With the invention, however, it is arranged that after the folded newspaper has been fed to the pocket, the wing-plate is activated to swing-in against the fixed support plate, so that the folded item will generally be held firmly pressed while the swinging-in of the said holding hooks is effected. By this swinging-in, the holding hooks shall wedge themselves in the space between the two folded half parts during the pressing back of the longest protruding half part, which according to the invention is made possible in that the wing-plate, along a part of its outermost extent, is configured with an outwardly, rearwards-inclined profile which will allow said wedging-in while the clamping-fast of the folded item is otherwise maintained. This clamping-fast during the gripping operation will obviously promote operational reliability.

**[0009]** A second important and even primary characteristic of the invention is that the gripping means, which are arranged at the outer end of the pivotal wing-plate, are not forcibly moved, but merely consist of projecting, passive, pivotal holding hooks which with an outer, inclined nose part will be forced to swing up over the outer edge of the longest protruding half part of the folded newspaper when this is clamped-in by the tilting forward of the wing-plate. With this simple drop-hook locking, which is controlled by the fold item itself, a reliable gripping can be achieved without the said overheight needing to be quite great.

**[0010]** Thereafter, the wing-plate can be tipped out for opening of the folded item for receiving the insert. During the end phase of the tipping back or out of the wing-plate, the holding hooks can be made to release their grip in the simple manner that with an inclined, rearwards-extending release arm part, they impinge against a release cam on the next following fixed support plate, so that the hook parts are forced to swing out from their engagement with the gripped edge of the item. Thereafter, the wing-plate can be swung back to an almost closed position of the pocket, where the item with its associated insert can be extracted by suitable extraction means after the releasing of the controlled grippers for the lowest protruding edge part of the item.

**[0011]** In the following, the arrangement and mode of operation of an example embodiment are explained in more detail with reference to the drawing, in which

fig. 1 is a schematic side view of an insert machine of the relevant type, while
fig. 2 is a more detailed view of a wing-wheel according to the invention used herein, and
fig. 3-10 are detail views to illustrate the function of this wheel.

**[0012]** The machine sketched in fig. 1 works in accordance with well-known principles. The main element is a wing wheel 2 which has protruding wing-rods 4 which form V-shaped pockets for receiving folded newspapers 6 delivered in a flow from a rotary press with the fold edge foremost. The rotation of the wheel 2 is controlled in such a manner that it can hereby receive a single newspaper in each of the wheel pockets.

**[0013]** At a level over the wheel 2, a magazine unit is provided for stacks of inserts 8 in respective magazines 10. From one or more of these magazines, the inserts can be dropped individually down onto a conveyor belt 12, controlled in such a way that inserts from selected magazines can be successively deposited in insert sets 14.Via a suitable transfer conveyor, these inserts or insert sets can be fed for introduction down into the wheel pockets, in which as shown at 16 the newspapers are held opened for reliable receipt of the inserts in the centre fold. Hereafter, the wheel pockets are moved further through an extraction station 18 at which the supplemented newspapers are extracted for feeding further along a conveyor 20 for final stacking or further processing.

**[0014]** The relevant task will hereby be to provide maximum security for the opening of the centre fold 16 of the newspapers, so that it can be ensured that the inserts 8,14 are inserted in a "clean" manner, also at high working speeds. In order for this to be achieved, the wing wheel 2 according to the invention is arranged in the following manner, cf. fig. 2:

**[0015]** The fixed wings 4 are configured in a tapering manner with a curved front edge forwards in the direction of rotation and with a straight rear edge. On the tip of the wing, mounted in a pivotal manner on a transverse axle 22, there is a hook element 24 which extends in an arc from a base part over an angle of approx. 90°, and which in a normal position has a free end lying outside the wing tip. The hook element is connected to a pinion 26 which co-operates with a rack 28 outermost on a push rod 30, which via a slide guide 32 extends in to a fixed hub part 34 configured with a control cam 36 which, by co-operation with a cam follower 38 on the rod 30, can slide this outwards so that the rack 28 and herewith the hook element 24 is swung downwards to the rear.

**[0016]** The same wing 4 has a pressure rail 40 lying behind at the rear edge of the wing, pivotally fastened at 42 to the outer end of a support arm 44 which is mounted extending out from a support block 46. This support block 46 is pivotally fastened to the hub of the wheel by a bearing 48, and is provided with a cam-follower roller 50 for co-operation with a fixed control cam 52. The support arm 44 can hereby be controlled for swinging forwards against the rear edge of the wing 4, where the pressure rail 40 can thus be tilted out around the bearing 42 to assume a position parallel with this rear edge (fig. 4).

**[0017]** At its outermost end, the pressure rail 40 has a rocker arm 54 which is pivotally mounted at 56, and which outermost supports a projecting hook part 58 with a hook 60 extending inwards. This arm can be pivoted between the protruding position shown in fig. 2 and the swung rearwards position shown in fig. 3, where the

hook 60 is drawn back into abutment against the front side of the outer end of the pressure rail 40. This latter position is a normal position, in that the upper end of the rocker arm is spring-loaded in the rearwards direction.

**[0018]** The outer end part of the pressure rail 40 is characterised in that it is formed with an outwards/rearwards inclined section as shown at 62.

**[0019]** In the receive position for the insertion of printed items 6, fig. 3, the support arm 44 and the pressure rail 40 will be swung completely backwards against the succeeding fixed wing 4, whereby the outer end of the rocker arm 54 is pressed against a rear edge flange 5 on the succeeding wing, so that the hook part 58,60 will be protruding from the pressure rail 40. There will now be plenty of room in the "pocket" 64 between the wings for safe receipt of the arriving newspaper.

**[0020]** Immediately afterwards, the support arm 44 is swung forwards (upwards) against its related fixed wing 4 for clamping the closed-together newspaper against this, namely with the view thereafter of being able to open the folded newspaper. From the printing press, the newspaper is folded in a slightly asymmetric manner, so that its rearmost half part in the direction of rotation extends slightly to the rear as shown at 66 in fig. 3.

**[0021]** After the introduction of the newspaper 6, the support arm 44 and herewith the pressure rail 40 are forced upwards/forwards under rotation of the wheel, whereby the pocket 64 is gradually closed, cf. fig. 4. At the position shown in fig. 5, the shortest protruding half-part of the folded newspaper has almost reached forward to the fixed wing 4, while the longer protruding edge part 66 of the other half-part abuts against the front end of the force-controlled hook element. 24. Under the further relative swinging-forward of the pressure rail 40, the retaining hook 60 on the hook part 58 will be pressed forward over the yielding outer edge of the rearmost, longest protruding edge part 66 of the newspaper item 6, which can be effected partly by a certain bending forward of this edge part, and partly by a certain degree of swinging-out of the hook part 58 brought about by the rearwards-inclined section of the retaining hook 60 itself, cf. fig. 6.

**[0022]** With a subsequent full clamping of the newspaper item against the fixed wing 4, the pressure rail 40 will be pressed in a parallel manner against the wing for good securing of the newspaper item despite an angled-out position of the support arm 44, with possibility herewith for automatic adjustment to newspaper items of different thickness.

**[0023]** In a concluding clamping position, the pressure pin 55 will be pressed against the fixed wing 4 via the clamped-together newspaper, whereby the rocker arm 54 will swing the retaining hook 58,60 further forward, cf. fig. 7, whereby the hook 60 will grip in over the high edge area 66 of the newspaper with increased security. By swinging around the swivel bearing 42, the pressure rail 40, which in the free state is clamped flexibly against the support arm 44, will lie flat in against the newspaper regardless of its thickness.

**[0024]** Thereafter, both edges of the newspaper will be securely gripped, and the pressure rail 40 can then be controlled for quick re-opening of the pocket 64, fig. 8, in that the retaining hook 58,60 will swing towards the right and thus bring the edge area 66 with it when the pressure pin 55 leaves its firm abutment against the clamped-in newspaper. Hereafter, the introduction of the insert 14 can be initiated.

**[0025]** When the pressure rail is swung all the way back, fig. 9, the release arm 61 on the retaining hook 58 will abut up against the stop 63, whereby the hook part 58,60 is swung up for the releasing of the edge area 66, which of its own accord will straighten out from the inclined surface 62 of the pressure rail. In fig. 2, a protruding pressure lug 68 is shown on the fixed wing 4 lying behind, and this lug will ensure a relative pressing-out of the edge area 66 from the hook 60. In practice, however, it has been found possible to omit these pressure lugs, which are rendered superfluous by the existence of the inclined surfaces 62. In its swung upwards and rearwards position, the hook 60 will be lying over the top of the pressure rail 40, whereby the releasing of the newspaper edge is effected with full security.

**[0026]** Thereafter, the pressure rail can again be swung forwards for partial closing of the pocket 64 during the further swinging-down of the wing to the delivery position shown in fig. 10. Just before this position is reached, the gripping element 24 on the fixed wing is controlled for opening, after which the newspaper into which the insert has been introduced is ready to be conveyed out by known means.

## Claims

1. Method for the placing of inserts in folded printed matter such as newspapers which are supplied from e.g. a rotary press with high capacity, by which method the printed items are fed in hanging condition with their fold edge lowermost, and are made to fall successively into V-shaped pockets formed by star-shaped support arms extending on a rotating roller, and are subsequently partly unfolded in these pockets for the receipt of the relevant insert(s), after which the printed items are successively conveyed from the pockets, said printed items being folded in such a manner that the fold is displaced from the centreline, so that opposite the fold edge they have a shorter side part and a longer side part extending out to form a protruding edge, which on the individual printed items lies rearmost in the direction in which they are fed, **characterised** in that

   the printed item which falls down into the pocket is influenced in the forwards direction for clamping abutment against the foremost sup-

port arm of the pocket,

the hook element (24) is thereafter swung rearwards from the foremost support arm of the pocket, i.e. rearwards for the drawing back of the protruding edge (66) and inwards behind the outer edge area of the shorter side part for the retaming of this side part,

a clamping rail (40), pivotally suspended in the pocket and with an outer, projecting gripping hook (60), is thereafter swung forwards to a position in which the gripping hook (60) extends in front of the upstanding edge (66),

thereafter, the clamping rail is swung rearwards while bringing with it the longer side part of the printed item, which is now retained by the gripping hook, for the opening of the printed item immediately before the introduction of the insert,

thereafter or at the same time herewith, the gripping hook is influenced for the release of the protruding edge,

the clamping rail is thereafter swung forwards again for complete or partial folding-together of the printed item, and

the printed item is then conveyed out of the pocket, if necessary after a short swinging back of the pressure rail.

**2.** Machine for the execution of the method according to claim 1, and with the main characteristic as appears from the description and the drawing.

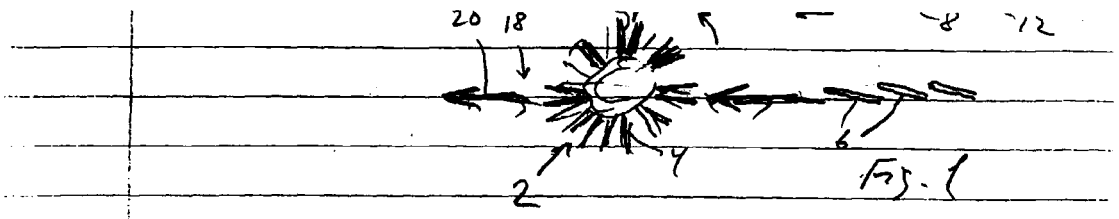
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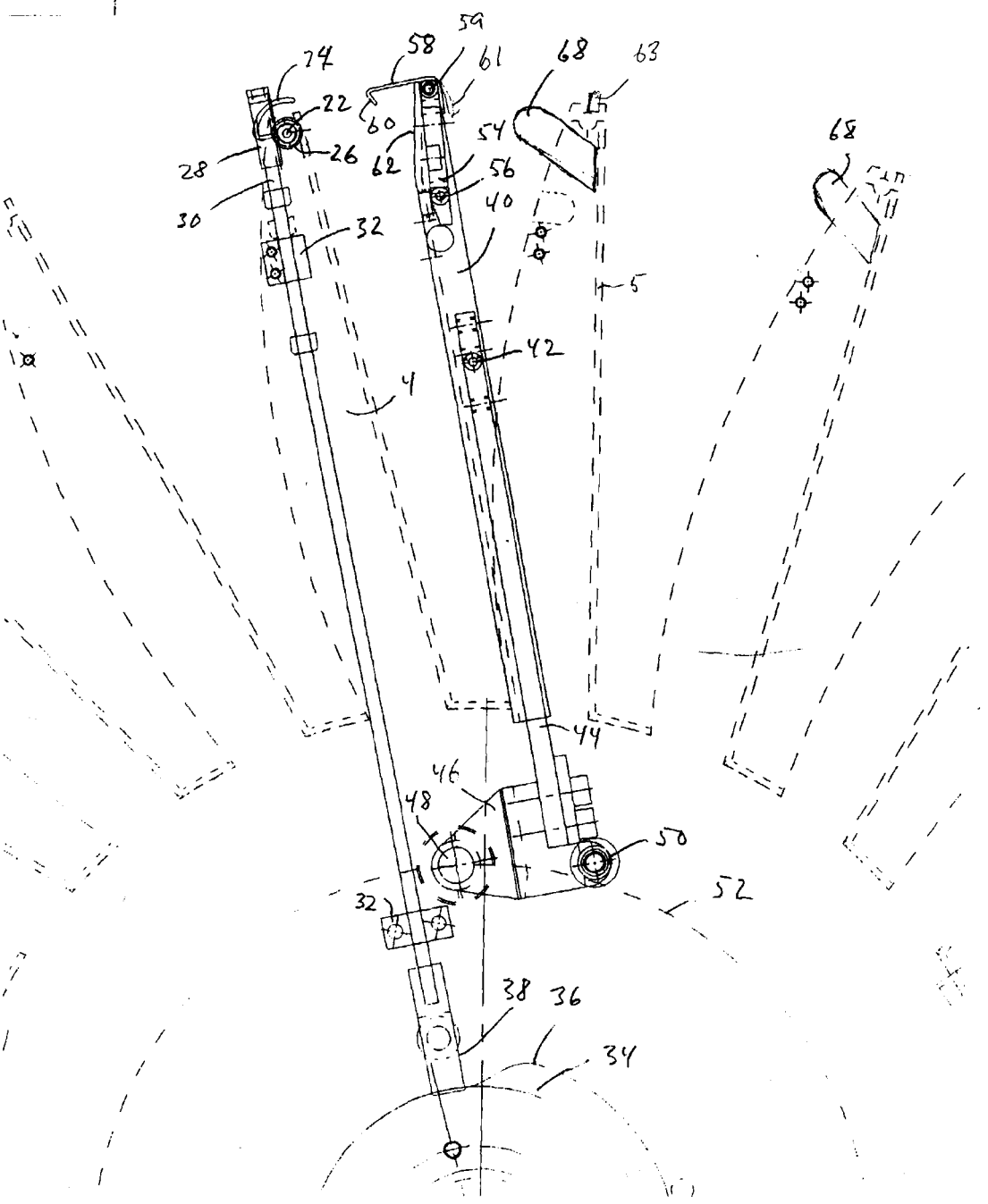
Fig. 1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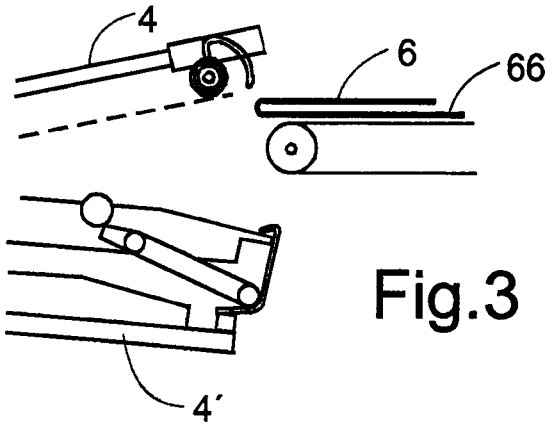
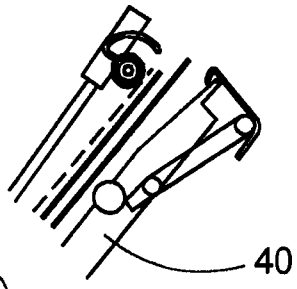



Fig.3

Fig.4



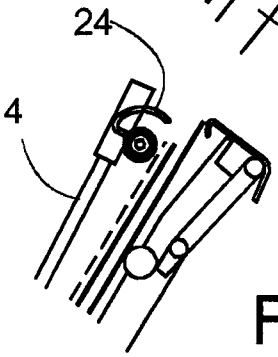




Fig.5

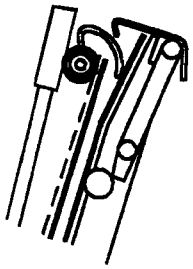


Fig.6

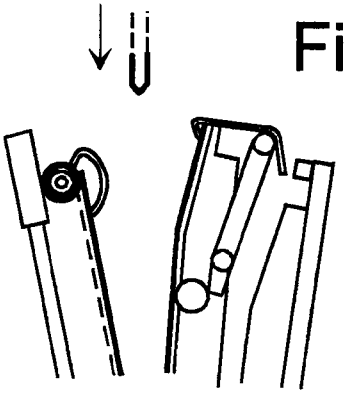


Fig.8

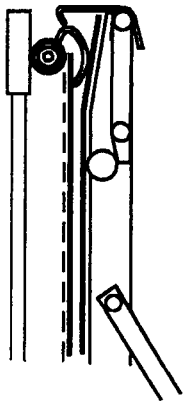


Fig.7

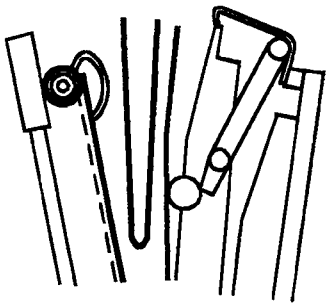


Fig.9

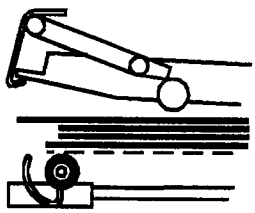


Fig.10